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ABSTRACT

The taxonomy of cohesion devised by M. A. K. Halliday and R. Hasen was used to examine the kinds of cohesive ties used in argumentative prose written by 105 sixth, tenth, and twelfth grade students. In this way, the study sought to determine whether there were differences between grade levels in the kinds of ties used and in the numbers of subjects at each grade level using the various types of ties. Certain kinds of cohesion (substitution, ellipsis, temporal and continuative conjunctives) occurred infrequently at all three grade levels. There were significant differences among grades for four kinds of cohesion (same lexical item, other lexical items, long-distance ties, long-distance ties in the last three T-units), all occurring more frequently at higher grades than lower grades. There were no significant differences between grades in the number of students using a given kind of cohesive tie. (Tables of findings are included.) (RL)

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COHESION IN ARGUMENTATIVE PROSE WRITTEN BY SIXTH-, TENTH- AND TWELFTH-GRADERS

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Cohesion in Argumentative Prose Written by Sixth-, Tenth-, and Twelfth-Graders

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An important new tool for the analysis of written discourse is the taxonomy of cohesive devices presented and described by Halliday and Hasan (1976). According to Widdowson, "cohesion refers to the way sentences and parts of sentences combine so as to ensure that there is propositional development." A discourse is cohesive to the extent that it permits of effective propositional development (Widdowson, 1978, 26-27). Cohesion can be described in terms of the syntactic and semantic links between sentences and parts of sentences. The five major types of cohesive links as listed in Halliday and Hasan's taxonomy are: reference, substitution, ellipsis, conjunction and lexical, each with a number of sub-categories.

Halliday and Hasan suggest various purposes which may be served by analyzing texts according to the taxonomy they have presented. Such analysis may have in view the teaching of composition, or the automatic analysis of text by computer, or stylistic studies. They suggest a number of possible questions for exploration: whether different genres or discourse types exhibit a tendency towards the use of certain types of cohesion rather than other types; whether particular writers favor one type of cohesion over others; whether the density of cohesive ties remains constant or varies; the relationship between cohesive ties and paragraphs

in a written text (332-333). Widdowson believes that studies of grammatical cohesion will help to inform language teachers in their efforts to devise exercises designed to develop skill in using cohesive devices (1979, 95).

The Present Study

The present study was designed to examine the kinds of cohesive devices used by students at various developmental levels. Specifically, it examined argumentative prose written by students at Grades 6, 10 and 12 in order to determine:

a. The types of cohesive ties used and the relative frequency of each type of tie at each grade level.

b. The number of students at each grade level using each type of tie.

c. Whether there were differences between grade levels in either i. the frequency of use of various types of cohesive ties, or ii. the number of students using each type of cohesive tie.

Method

Subjects: Subjects were from two high schools and four elementary schools in Brandon, Manitoba, a city of approximately 40,000. Students in ten twelfth-grade classes (N = 206), eleven tenth-grade classes (N = 228), and eight sixth-grade classes (N = 223) were randomly assigned to write in either the mode of narration or the mode of argument so that there was approximately the same number of students writing in each mode in each classroom. Thirty-five compositions were randomly chosen from the argumentative compositions at each grade level.

Procedure: Students wrote in response to a color slide showing a performing whale in mid-air. Students in the argument condition were asked

to write at least one page on the following topic: "Some people have objected to the whale's being treated in this way. The manager is wondering whether he should close down this kind of entertainment. Decide what your opinion is. Now imagine that your teacher disagrees with you. Your task is to try to convince your teacher that your opinion is right. Use all the arguments you can think of." Identical printed assignment sheets were used to administer the assignment at all three grade levels. Students were allowed forty minutes to write.

Scoring: The compositions were divided into T-units. Compositions were scored for cohesive devices using the coding system of Halliday and Hasan as presented in Cohesion in English (197€). Only ties across T-unit boundaries were coded. The following types of cohesive ties were scored:

1. Reference
   a. Pronominals
   b. Demonstratives and the definite article
   c. Comparatives, e.g., similar, other
2. Substitution
   a. Nominal, e.g., ones
   b. Verbal, e.g., do as in They DO too.
   c. Clausal, e.g., so as in They think SO too.
3. Ellipsis
   a. Nominal, e.g., The parents could not be traced. BOTH were abroad.
   b. Verbal, e.g., Jill should have been warned but she WASN'T.
   c. Clausal, e.g., Are they selling their house? Yes, they ARE.
4. Conjunction
   a. Additive, e.g., and, furthermore, in other words

b. Adversative, e.g., but, on the contrary, however

c. Causal, e.g., so, therefore, on account of this

d. Temporal, e.g., then, next, in the first place, finally

e. Other ('continuative'), e.g., now, of course, well, anyway

5. Lexical

a. Same item, i.e., repetition of the same word

b. Synonym or near synonym

c. Superordinate

d. General item, e.g., thing

e. Collocation, i.e., the use of a lexical item that regularly co-occurs with a previously used lexical item as, for example, with such pairs as: laugh/joke, blade/sharp, garden/dig, day/night.

Compositions were scored by a trained student assistant. After training, the student assistant and the investigator independently scored cohesive ties in ten twelfth-grade and ten tenth-grade arguments. The percentage agreement on the twenty essays was 86.18. The remainder of the essays were scored by the student assistant and checked for errors or omissions by the investigator. Errors in scoring tended to be either an inadvertent omission, or a collocational lexical item. The checking of scoring by the investigator served as a check against omissions. Where differences of opinion existed between investigator and assistant about a collocational lexical item, the difference was resolved by discussion between the two on the basis of guidelines established for collocational items during training.

Since certain kinds of cohesive ties occurred infrequently, several sub-categories were collapsed as follows: all substitutions and ellipses were collapsed into a single category for each; two categories only were

used for lexical ties, namely, same lexical item and other lexical item.

In addition to counting the ties in the above categories, two other kinds of scores seemed of possible interest. It seemed likely that older students might a. use a greater variety of conjunctive ties, and b. be more inclined to set out at the beginning of the essay arguments to be developed later, and to sum up at the end arguments used in the body of the essay. To measure the first, we counted the different kinds of conjunctive ties used in each essay. To measure the second, we counted long-distance ties which we arbitrarily decided would be those ties which linked T-units separated by at least five T-units provided that there were no intermediate ties and that five T-units constituted at least one-third of the essay.

Based on the coding described above, the following scores were calculated for each essay:

1. Mean number of pronominal-reference ties per T-unit.
2. Mean number of demonstratives and definite articles per T-unit.
3. Mean number of comparative-reference ties per T-unit.
4. Mean number of substitutions per T-unit.
5. Mean number of ellipses per T-unit.
6. Mean number of additive conjunctives per T-unit.
7. Mean number of adversative conjunctives per T-unit.
8. Mean number of causal conjunctives per T-unit.
9. Mean number of temporal conjunctives per T-unit
10. Mean number of continuative conjunctives per T-unit.
11. Mean number of same lexical item per T-unit.
12. Mean number of other lexical items per T-unit.
13. Variety of conjunctives.

14. Mean number of long-distance ties per T-unit.

15. Number of long-distance ties in the last three T-units.

Method of Analysis: Each of the above scores was analyzed by a one-way analysis of variance. The number of students at each grade using each kind of cohesive tie was analyzed using chi-square. Results were tested for significance at the .05 level.

Results

Means and standard deviations for the number of words per essay at Grades 6, 10 and 12 respectively were as follows: Grade 6: $\bar{X}$ = 189, sd = 59; Grade 10: $\bar{X}$ = 205, sd = 34; Grade 12: $\bar{X}$ = 230, sd = 41. Means and standard deviations for the number of T-units per essay were as follows: Grade 6: $\bar{X}$ = 14.31, sd = 4.43; Grade 10: $\bar{X}$ = 14.94, sd = 4.09; Grade 12: $\bar{X}$ = 15.51, sd = 3.66.

There were no significant differences between the numbers of students in different grades who used the various kinds of cohesive ties. The three kinds of ties which showed the greatest difference in the number of students using them were temporal conjunctives, ellipses and long-distance ties in the last three T-units (See Table 1), but the differences were not significant. The following types of ties were used by more than 90 percent of students at each grade level: same lexical item, other lexical item, pronominal reference, demonstratives and the definite article. Types of cohesive ties used by at least 74 percent of students at each grade level were: additive conjunctives and long-distance ties. Ties used by half to two-thirds of students were: comparative reference, adversative conjunctives and causal conjunctives. Substitution, ellipsis, temporal conjunctives and continuative conjunctives were used by few students at any grade level.

For the relative frequency of each type of cohesive tie, there was a significant main effect for grade on the following measures:

a. Same lexical item, $F(2;102) = 9.53$, $p < .001$. Grade 12 students scored significantly higher than students in either Grade 6 or Grade 10. (See Table 2)

b. Other lexical items, $F(2,102) = 9.089$, $p < .001$. Students in Grades 10 and 12 scored significantly higher than students in Grade 6. Means for each grade level are presented in Table 2.

c. Long-distance ties, $F(2;102) = 4.25$, $p < .05$. Students in Grades 10 and 12 scored significantly higher than students in Grade 6. Means for each grade are presented in Table 2.

d. Long-distance ties in the last three T-units, $F(2;102) = 6.26$, $p < .01$. Students in Grades 10 and 12 scored significantly higher than students in Grade 6. Means for each grade are presented in Table 2.

Discussion

On three types of cohesive ties, students in Grades 10 and 12 scored significantly higher than students in Grade 6. These were long-distance ties, long-distance ties in the last three T-units, and other lexical items. Long-distance ties in the last three T-units is, it is to be noted, a sub-set of long-distance ties. Both these measures reflect a greater tendency by tenth- and twelfth-graders to foreshadow arguments to be developed later--often done in the opening sentences of the essay--and to sum up at the end arguments made during the essay. These two behaviors were much less frequent in sixth-graders. Examples of long-distance ties, especially long-distance ties in the last three T-units, for each of Grades 10 and 12 are presented in Tables 3 and 4. In excerpt 1 in Table 3, cruel in TU (i.e., T-unit) 1 is picked up by inhuman in TU 11, the opening T-unit of a new paragraph which elaborates on the statement; mate in TU 2 appears again in TU 8; scientifically-devised diet

in TU 7 is picked up by well-fed in TU 15, the final T-unit. In excerpt 2 in Table 3, against the law in TU 1 is picked up by crime in TU 19. In excerpt 3, circuses and bullfight in TU's 4 and 7 respectively are repeated in TU 17. In excerpt 4, specialists in TU 6 is repeated in TU 15. In excerpt 6, in the wild in TU 2, killed in TU 3, and captivity in TU 4 are picked up by captivity, dead and in the wild in TU 15. A similar tendency, though not to as great an extent, was shown by Grade 10 students as illustrated in excerpts from Grade 10 compositions in Table 4.

The higher scores of tenth- and twelfth-graders on other lexical items reflects, in part, the greater lexical resources of the older students and perhaps also a more conscious effort to try to use a variety of words rather than repeating the same one. Thus, for entertainment, the following range of synonyms or near-synonyms was used by twelfth-graders: routines, stunts, tricks, antics, performances, balancing act, exhibition, show. A second tendency which increased the number of other lexical items, especially at Grade 12, was for students to develop an argument rather than merely stating it in a single sentence as was commonly done at Grade 6. Such elaboration usually required the repetition of a concept, the introduction of a related word, or, sometimes, the juxtaposition of pairs of opposites which counted as a collocational item. For example, in excerpt 4 in Table 3, find out about, learn and study occur in TU's 6, 7 and 8. In excerpts 8, 9 and 10, the following pairs of related terms occur in sequential T-units: gain knowledge/ learn about; research / study; falling ill/thriving.

On same lexical item, Grade 12 scored significantly higher than Grade 6 or Grade 10. This kind of cohesive tie scored higher than all other types of cohesive ties at all three grade levels, excluding the two scores (variety

of conjunctive items and long-distance ties in the last three T-units) which were not pro-rated according to the number of T-units in the composition. This fact is largely explained by the fact that there was a set of words related to the topic (e.g., whale, animal, entertainment, train, trainer, treated, free, captivity, keep, close down) which occurred frequently in compositions at all three grade levels. Words from this small set accounted for a very high proportion of the instances of same lexical item at Grade 6 which scored higher on this item than Grade 10, though not significantly so. The high scores of Grade 12 students on same lexical item was initially surprising since commonsense seemed to indicate that immature writers, having less diversified vocabularies, would be most likely to repeat lexical items and thus score highest on this measure. Careful examination of the compositions revealed that the explanation lay in the tendency of twlfth-graders to forshadow, elaborate and sum up arguments thus producing both repetitions of lexical items,and related lexical items which increased their scores on other lexical items as noted above. Twelfth-graders engaged in these behaviors to a greater extent that tenth-graders and to a much greater extent than sixth-graders. Illustrations of this tendency are to be noted in the excerpts from Grade 12 arguments presented in Table 3. In excerpt 1, supporters occurs in TU's 1 and 4. In excerpt 4, learn occurs in TU's 6, 7 and 8 while specialists occurs in TU's 6 and 15. In excerpt 5, scientific occurs in TU's 6 and 9, and study(ies) occurs in TU's 6, 8, 9 and 18.

Equally as interesting as the differences which were found between grades in this study were the similarities. Out of fifteen scores, only four showed significant differences between grades. Moreover, the numbers of students at each grade level using each kind of cohesive tie were remarkably

similar, as illustrated in Table 1. Some of these similarities were predictable. It was predictable that pronouns, demonstratives and the definite article would be widely used at all grade levels. It was predictable, also, that ellipsis and substitution would occur relatively infrequently since these forms of cohesion are more common in informal, conversational discourse.

Some of the similarities are more surprising. It might have been expected, for example, that older students would have made more use in argumentative prose of temporal conjunctive ties since they might have been expected to enumerate arguments and to signal overtly concluding statements by such words as finally or in conclusion. Temporal conjunctives were little used - by only six sixth-graders, four tenth-graders and eleven twelfth-graders. However, an examination of the specific words used indicates a difference between older and younger students which is in the expected direction. The only temporal conjunctives used at Grade 6 were then and soon whereas those used at tenth and twelfth grades included: again, for one thing, first of all, next, all in all, finally, in concluding, to sum it up, in conclusion, summing up. It is possible that the tendency noted for older students to use more temporal conjunctives of such a kind as to mark the structure of their argument might have been more pronounced if students had been able to revise their essays rather than turning in first drafts. Commonsense and introspection would lead one to predict that adding needed or useful cohesive ties of the kind indicated would be a likely kind of revision to make.

An examination of the exact cohesive items used in three of the other conjunctive categories, i.e., additive, adversative and causal, revealed further similarities and differences not revealed by the summed data which was statistically analyzed. At all three grade levels, the most commonly

used additive conjunctives were and and also. However, both the absolute number of and'susedand the percentage of and's compared with other additive conjunctives decreased from Grade 6 to Grade 10 and From Grade 10. (See Table 6)

At all three grade levels, the most common adversative conjunctive used was but. However, whereas but comprised eighty-three percent of adversatives at Grade 6, it comprised on sixty-eight percent at Grade 10 and fifty-six percent at Grade 12. Tenth- and twelfth-graders used a much wider range of adversatives including: however, rather, yet, instead, in fact, on the other hand, though, actually. (See Table 6)

At all three grade levels, the most common causal conjunctive was so. However, both the absolute number of so's and the percentage of so's compared with other additive conjunctives decreased from Grade 6 to Grade 10 and from Grade 10 to Grade 12. (See Table 6)

Many so's at Grade 6 occurred in the final T-unit. Few Grade 6 students summed up their arguments as tenth- and twelfth-graders were inclined to do. A significant number of Grade 6 compositions ended abruptly without any kind of concluding statement. However, a number of sixth-graders, aware, apparently, of the need to make a concluding statement but not practiced in the summing-up strategy used by older students, ended with a so-statement. Sometimes the final so-statement was tied in with a reason given in an immediately preceding T-unit (e.g., "The whale likes to do the tricks, so the whale should stay and make people all over the world happy." "It is great entertainment and people enjoy it. So it should be left open."). Often, however, the cohesive function of so was much vaguer as in the following examples: So I think there should be whale shows. So I think that this kind of entertainment shouldn't be allowed. So I think whales should be let go into the ocean and not used as entertainment. So we better quit this type of enter-

tainment. The force of so in such cases as something like "therefore, in the light of all the foregoing arguments" rather than being tied in with the immediately preceding statement. This common use of the final so-statement, whether it followed an immediately preceding reason, or whether it was used more vaguely to refer to all the preceding arguments, contributed significantly to the large number of so's at Grade 6. Apart from so, virtually no other causal conjunctives were used at Grade 6 whereas at Grade 12, therefore was used almost as often as so.

To summarize: this study of the cohesive devices used at three grade levels showed differences in the usage of lexical items and long-distance ties. Those differences reflect both older students' more diversified vocabularies and their greater ability to use strategies appropriate for argumentative discourse, namely outlining their arguments at the beginning of the essay, summing up at the end by referring back to arguments made, and elaborating on arguments rather than merely stating them. These tendencies were better developed at Grade 12 than at Grade 10 and at Grade 10 than at Grade 6. An alternate strategy used by several sixth-graders to replace the summing-up of arguments was signalled by the large number of so's used by sixth-graders.

It seems clear that the most informative research on cohesion in students' writing will not come merely from counting instances. Similar scores at different grades sometimes concealed differences which were only revealed by close examination of the exact items used in a specific cohesion category. In some cases, differences existed between grades in the way a particular item was used, for example, so.

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TABLE 1

Number of Subjects at Each Grade Level
Using Cohesive Ties of Various Kinds

TYPE OF COHESIVE TIE	GRADE 6	10	12
Same lexical item	35	35	35
Other lexical items	33	35	35
Pronominal reference	34	35	32
Reference: demonstratives and definite article	33	34	35
Additive conjunctives	30	31	29
Long distance ties	28	33	33
Long distance ties in last three T-units	21	31	30
Comparative reference	15	21	16
Adversative conjunctives	20	23	20
Causal conjunctives	19	16	17
Substitutions	6	8	5
Ellipses	9	12	5
Temporal conjunctives	6	4	11
Continuative conjunctives	11	8	4

TABLE 2

Mean Scores for Cohesive Ties of Various Kinds at Each Grade Level

TYPE OF COHESIVE TIE	GRADE 6	10	12
Same lexical item	1.16	1.05	1.38
Other lexical items	.219	.379	.364
Substitutions	.011	.025	.008
Ellipses	.026	.027	.009
Pronominal reference	.44	.40	.38
Reference: Demonstratives and definite article	.40	.41	.50
Comparative reference	.047	.057	.052
Additive conjunctives	.14	.12	.14
Adversative conjunctives	.067	.075	.053
Causal conjunctives	.064	.041	.041
Temporal conjunctives	.020	.007	.025
Continuative conjunctives	.023	.019	.008
Variety of conjunctives	2.54	2.74	2.74
Long distance ties	.145	.226	.227
Long distance ties in last three T-units	1.14	2.31	2.17

TABLE 3

Excerpts from Grade 12 Arguments

	Supporters of the theory that keeping a whale in captivity is wrong invariably state that it is cruel to do such a thing to a free being.[1] They say, "What of his freedom to swim where he chooses and to find love in the ocean with the mate of his choice?" 2 This point of view is not one of reason. 3 Rather, the supporters are imposing their own sentimentality on the whale. 4
	. . .
1	A whale in a climate-controlled pool being fed a scientifically-devised diet has, however, a near perfect chance of dying a natural death. 7 In most marinelands, a mate is provided for both the satisfaction of a biological urge and for companionship. 8 . . . It is also claimed that teaching a whale tricks is inhuman. 11 . . . In conclusion, it can be said that in a tank a whale is healthy, happy and well fed -- a great deal more than he would be in nature. 15
2	I don't really think that it's against the law to treat whales this way. 1 . . .I don't think that it is a crime to take some of them captive. 19
3	Circuses keep elephants, giraffes, monkeys and a lot of other types of animals closed up. 4 . . . In Mexico and also in Spain, bulls are not only used for entertainment, 6 but every bullfight, the six bulls of the fight are killed. 7 . . . Such forms of entertainment as bullfighting and circuses would also have to be closed down. 17
4	Specialists can also find out much more about the killer whale and learn from them, for example, their intelligence, instincts, habits and how they survive. 6 They could learn what they eat and see them give birth which would be a rare experience. 7 They also could learn how to care for them and what they all want. 8 . . . Also it would be hurting the whale by not letting specialists know about the killer whale. 15
5	These whales bring enjoyment to many people through their exciting exhibitions.4 . . . The whales are also used in scientific studies 6 and through these much has been found out about the whale's habits and life. 7 Since it would be hard to study a whale in the open ocean, it would be much easier to study them in captivity. 8 Therefore, in the light of scientific studies that contribute to marine biology, captivity of whales is useful. 9 . . . Therefore I can see no wrong in this form of entertainment because of the entertainment it provides and the opportunity for studies. 18

6	Animals in the wild are always (under) threat. 2 They do not know where their next meal is coming from or whether they will be killed by an enemy before it's time for the next meal. 3 In captivity, the animal is always safe. 4 No natural enemies can get at the creature. 5 Thus it is safe . . . 6 . . . Would you rather have a living animal in captivity or a dead one in the wild. 15
7	I could see if the whales were falling ill and dying that this act would be cruel and inhumane, but they seem to be thriving and enjoying their existence.
8	People do not gain knowledge of nature by watching a man-programmed animal. The only way to learn the truth about an animal is in its true environment.
9	The whale is not only a source of entertainment but also it serves as a research for scientisits. The study of whales is easier in a small area.

TABLE 4

Excerpts from Grade 10 Arguments

1	People come from all over to see the Marineland animals and their tricks and antics. 2 The animals don't mind performing for the people because they get plenty of attention. 3 . . . The animals enjoy performing for the people 16 and the people enjoy watching them perform. 17
2	Whales are soon going to be extinct if they do not stop being hunted. 2 The more whales there are out in the ocean swimming around, the more hunters will kill them and the less we will see of them. 3 The whales, as shown in the picture, are used for entertaining. 4 Thus they are well fed and well cared for. 5 . . . Would you like to be free but obtain your own food and probably be hunted down before you have had a chance to really live 10 or would you rather be away from killers, kept behind a well-protected cage and be well looked after and fed? 11
3	I don't think the manager should close down this kind of entertainment mainly because the people that go to watch these shows enjoy them very much. 1 Some people may say that it's cruel to keep these animals trapped in a small body of water. 2 . . . So again, I think this kind of entertainment should keep up, 15 and who knows, 16 it might be the animals that get their kicks watching the humans. 17.

TABLE 5

The Numbers and Percentages of Additive, Adversative and Causal Conjunctives Used at Grades 6, 10 and 12.

WORD	GRADE 6		10		12	
	#	%	#	%	#	%
and	49	71	36	56	34	47
also	16	23	13	20	30	42
other	4	6	15	23	8	11
but	29	83	28	68	19	56
other	6	17	13	32	15	44
so	25	96	15	79	9	53
other	1	4	4	21	8	57